

Modifying Proximity Circuits to Measure the Fullness of Containers and the Flow Rate of Fluids Through Pipes

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There are many instances in industrial and commercial settings in which one might wish to assess the fullness of a container or even determine the flow rate of a fluid through a pipe without having to use mechanical means, such as a scale or a pinwheel in order to take a direct measurement. In many circumstances, extreme conditions such as heat or inaccessibility make this impractical.

Proximity circuits, which have been used for eight decades as a mechanism for controlling the timing of the detonation of bombs, (generally in order to ensure that they detonate just above ground level,) could, with some slight modification, be used to make more detailed inferences about its surroundings. In addition to determining how far away something is, a proximity circuit could be used to determine how solid or full a container is. A retail outlet might use such a circuit to determine if a display is devoid of product, a restaurant might use it to determine when a tray of food needs to be replaced, or an industrial-scale printing facility might use it to determine when a drum of ink needs to be replenished.

In the case of determining the flow rate of a fluid through a pipe, one might think a proximity circuit less useful given that the pipe is always full of fluid and that a proximity circuit should return identical readings whether water is flowing or not. However, if we were to slightly modify a basic proximity circuit to add a mechanism which introduces acoustic energy to the fluid, this would create a measurable disturbance in the readings of the proximity sensor. If the acoustic energy was projected from the side of the pipe in a perpendicular direction, flowing fluid would carry it in parallel with the pipe and the distance this reverberating energy is carried in parallel with the pipe in a given span of time could be used to accurately estimate the flow rate of fluid through the pipe.

The might be termed *acousto-migrative resistometry*. A fluid bestowed with acoustic energy would act, essentially, as a “tracer” which could be tracked as the fluid moves through the pipe. The same technique could have medical applications as it would allow for fluid dynamics to be tracked non-invasively.